REMARKS

Claims 1-16 are pending in this application. By this Amendment, claims 1, 7 and 13 are amended. Claim 13 is amended to further distinguish over the references cited in the Office Action. Claims 1, 7 and 13 are amended to overcome claim rejections under 35 U.S.C. §112.

No new matter is added to the application by this Amendment. Support for the language added to claim 13 can be found in the claims as originally filed and in the specification at, for example, paragraph [0044].

Reconsideration of the application is respectfully requested.

I. Rejection Under 35 U.S.C. §112

Claim 1 was rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. This rejection is respectfully traversed.

The Patent Office alleges that there is insufficient antecedent basis for "the sheet feed tray" in claim 1.

Claims 1, 7 and 13 are amended to replace the phrase "the sheet feed tray" with "a sheet feed tray." Thus, there is sufficient antecedent basis for the sheet feed tray in claims 1, 7 and 13.

Thus, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. §112, second paragraph.

II. Rejection Under 35 U.S.C. §103(a)

Claims 1-16 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent Application Publication No. 2001/0020765 to Araki et al. in view of U.S. Patent No. 6,565,079 to Kakegawa et al. and further in view of U.S. Patent Application Publication No. 2005/0073088 to Watase. This rejection is respectfully traversed.

None of Araki et al., Kakegawa et al. and Watase, taken singly or in combination, teaches or suggests a sheet feeder (claim 1) or an image forming apparatus (claim 7) that includes (1) a direction detection unit that detects a change of a rotation direction of the separating member and (2) a separating force adjusting unit that gradually increases a reverse rotation torque of the separating member from a predetermined initial torque after the sheet detection unit detects the recording sheet and stops the increase of the reverse rotation torque to maintain the reverse rotation torque when the direction detection unit detects reverse rotation of the separating member. Similarly, none of Araki et al., Kakegawa et al. and Watase, taken singly or in combination, teaches or suggests a method for preventing double feeding of recording sheets in a sheet feeder (claim 13) that includes any of (1) detecting a change of a rotation direction of the separating member, (2) gradually increasing a reverse rotation torque of the separating member from a predetermined initial torque after performing the detection of each recording sheet being inserted between the sheet feed member and the separating member or (3) stopping the increase of the reverse rotation torque to maintain the reverse rotation torque when reverse rotation of the separating member.

Direction Detection

The Patent Office acknowledges that Araki et al. fails to disclose a direction detection unit. The Patent Office introduces Kakegawa et al. as allegedly teaching a similar device that includes a direction detection unit shown as element 254 in FIG. 4 of Kakegawa et al. Element 254 in FIG. 4 of Kakegawa refers to a sensor 254 of a rotation detector 250 which includes an optical sensor comprised of a light-emitting element 255 and a light-receiving element 256 (see col. 11, lines 33-41 and FIG. 9 of Kakegawa et al.). The number of revolutions of the rotation axis 232 of the electromagnetic brake 230 can be detected from the light interval received by the light-receiving element 256 of the sensor 254 (see col. 11, lines 45-48 of Kakegawa et al.).

Contrary to the allegations of the Patent Office, Kakegawa et al. fails to teach or suggest a direction detection unit that detects a change of a rotation direction of the separating member as recited in claims 1 and 7. Additionally, Kakegawa et al. fails to teach or suggest a method that includes detecting a change of a rotation direction of the separating member as recited in claim 13. Instead, Kakegawa et al. teaches that the rotation-detecting sensor 254 detects a rotary state, such as a rotating state or a stopped state of the brake roller 206 (see col. 15, line 57 to col. 16, line 1 of Kakegawa et al.). The sensor 254 also detects whether the brake roller 206 is rotating normally or unstably (see col. 16, lines 51-58 of Kakegawa et al.). Moreover, Kakegawa et al. teaches that a controller 800 can determine from an output of the sensor 254 that the brake roller 206 is rotating and the rotary speed of the brake roller 206 from a cycle of the sensor 254 (see col. 19, lines 13-20 of Kakegawa et al.).

Nowhere does Kakegawa et al. teach or suggest that the sensor 254 detects a change in the rotation direction of the brake roller 206. Kakegawa et al. also fails to teach or suggest that the brake roller 206 changes rotation directions. As discussed above, the optical sensor of sensor 254 in Kakegawa et al. merely detects a number of revolutions of the rotation axis 232 of the electromagnetic brake 230 from the light interval received by the light-receiving element 256 of the sensor 254. By detecting the number of revolutions of the rotation axis 232 from the light interval received by the light receiving element 256, the sensor 254 is incapable of detecting a change of the rotation direction of the brake roller 206 if such a change was capable of occurring.

Even if the brake roller 206 was capable of changing rotation directions, the sensor 254 would be unable to determine such a change in the rotation direction based a light interval received by the light-receiving element 256 of the sensor 254. Merely counting the number of revolutions of the rotation axis cannot determine a rotation direction of the brake roller 206. Thus, the sensor 254 of Kakegawa et al. is not the same as or similar to the

direction detection unit which detects a change of rotation direction of the separating member as required in claims 1 and 7. Further, determining the number of revolutions of the rotation axis 232 or determining whether the brake roller 206 is rotating or not rotating with the sensor 254 of Kakegawa et al. is not the same as or similar to detecting a change of a rotation direction of the separating member as required in claim 13. Moreover, nowhere does Kakegawa et al. teach or suggest a separating force adjusting unit which gradually increases a reverse rotation torque of the separating member from a predetermined initial torque after the sheet detection unit detects the recording sheet, and stops the increase of the reverse rotation torque to maintain the reverse rotation torque when the direction detection unit detects reverse rotation of the separating member as required in the present claims.

Separating Force Adjustment

Contrary to the allegations of the Patent Office, Araki et al. and Kakegawa et al., taken singly or in combination, fail to teach or suggest a separating force adjusting unit which gradually increases a reverse rotation torque of the separating member from a predetermined initial torque after the sheet detection unit detects the recording sheet and stops the increase of the reverse rotation torque as recited in claims 1 and 7. Additionally, Araki et al. and Kakegawa et al., taken singly or in combination, fail to teach or suggest a method that includes detecting a change of a rotation direction of the separating member and gradually increasing a reverse rotation torque of the separating member from a predetermined initial torque after performing the detection as recited in claim 13.

Instead, Araki et al. teaches that the multi-transport detection sensor detects the sheet multi-transport, a signal indicating this is inputted to a controller, then the hopper is lowered, the pressing force between the retard roller and the separation roller is reduced, and the rotation torque of the retard roller is further increased. Moreover, reducing the pressing force between the retard roller and the separation roller as taught by Araki et al. is not the same as

or similar to the recited separating force adjusting unit of claims 1 and 7 and the detecting a change of a rotation direction of the separating member and gradually increasing a reverse rotation torque of the separating member from a predetermined initial torque after performing the detection as recited in claim 13.

Nowhere does Kakegawa et al. teach or suggest a separating force adjusting unit which gradually increases a reverse rotation torque of the separating member from a predetermined initial torque after the sheet detection unit detects the recording sheet and stops the increase of the reverse rotation torque. Additionally, the Patent Office does not allege that Kakegawa et al. teaches the recited separating force adjusting unit (claims 1 and 7) and detecting a change of a rotation direction of the separating member and gradually increasing a reverse rotation torque (claim 13). Thus, Kakegawa et al. fails to remedy the deficiencies of Araki et al. because Kakegawa et al. fails to teach or suggest the recited separating force adjusting unit as required in claims 1 and 7 and the recited method of claim 13.

Watase

Watase fails to remedy the deficiencies of Araki et al. and Kakegawa et al. Specifically, Watase also fails to teach or suggest (1) a direction detection unit that detects a change of rotation direction of the separating member and (2) a separating force adjusting unit as recited in claims 1 and 7, or a method that includes (1) detecting a change of a rotation direction of the separating member, (2) gradually increasing a reverse rotation torque of the separating member from a predetermined initial torque after performing the detection of each recording sheet being inserted between the sheet feed member and the separating member, or (3) stopping the increase of the reverse rotation torque to maintain the reverse rotation torque when reverse rotation of the separating member as recited in claim 13. Watase merely teaches a registration sensor 22 that detects the leading edge of the sheet whereby the driving

motor stops rotating and the driving force is no longer conveyed to the feed roller 3 (see paragraph [0039] of Watase), which is not a direction detection unit or method.

Additionally, Watase also fails to teach or suggest the recited separating force adjusting unit as recited in claims 1 and 7 and the detecting a change of a rotation direction of the separating member and gradually increasing a reverse rotation torque of the separating member from a predetermined initial torque after performing the detection as recited in claim 13.

Because at least the above-discussed features of independent claims 1, 7 and 13 are not taught or suggested by Araki et al., Kakegawa et al. and Watase, taken singly or in combination, these references would not have rendered the features of claims 1, 7 and 13 obvious to one of ordinary skill in the art.

For at least these reasons, claims 1-16 are patentable over the applied references. Thus, withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-16 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

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